CHAPTER 11: MASTER REMOVAL SECTION

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1. Theory of Operation

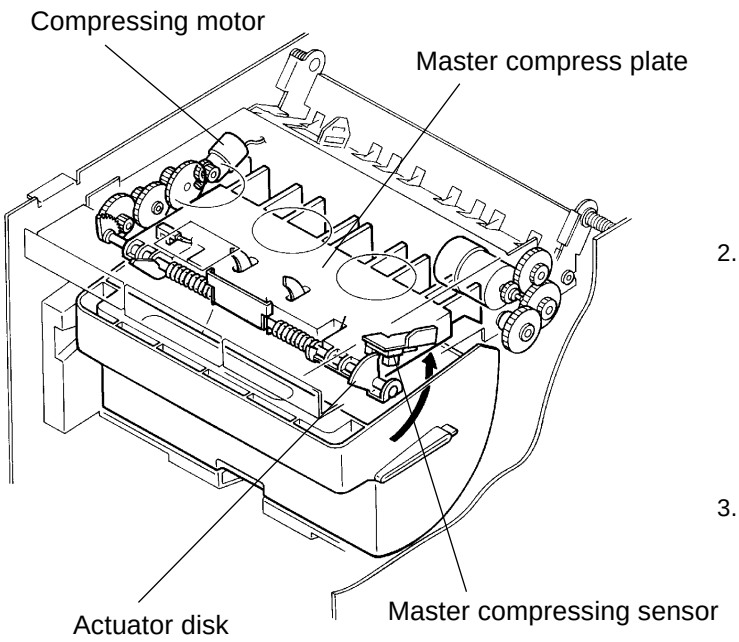
1. Master Removal Unit Home Positioning Mechanism

The Master removal unit returns to its home position each time the power is turned ON, All Reset Button is pressed, or Master removal cover is opened and closed.

1. When Master compress plate is already at home position.
- Compressing motor is activated to rotate the Master compress plate down until the actuator disk on the Master compress plate blocks the light path of the Master compressing sensor, and then stops.
- Then the motor rotates in the opposite direction to raise the Master compress plate to the horizontal position until the actuator disk on the Master compress plate escapes from the light path of the Master compressing sensor.

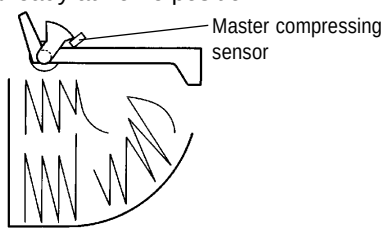
2. When the Master compress plate is all the way down.
- The motor rotates the Master compress plate down, but since the actuator disk is already past the Master compressing sensor from the start, the light path of the sensor cannot be blocked by the disk.
- The motor stops and then rotates in the opposite direction to raise the Master compress plate to the horizontal position.
- The motor stops and completes the home positioning movement when the actuator disk escapes from the light path of the Master Compressing sensor.

3. When the Master compress plate is at a halfway position.
- The disk is already blocking the Master compressing sensor.
- The motor moves the Master compress plate all the way down until the disk escapes from the light path of the Master compressing sensor.
- The motor stops and then rotates in the opposite direction to raise the Master compress plate to the horizontal position until the actuator disk escapes from the light path of the Master compressing sensor.

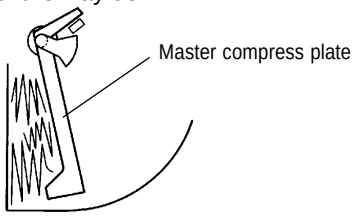


Master compress plate position

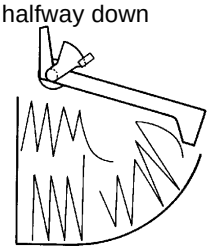
1. When already at home position



2. When all the way down

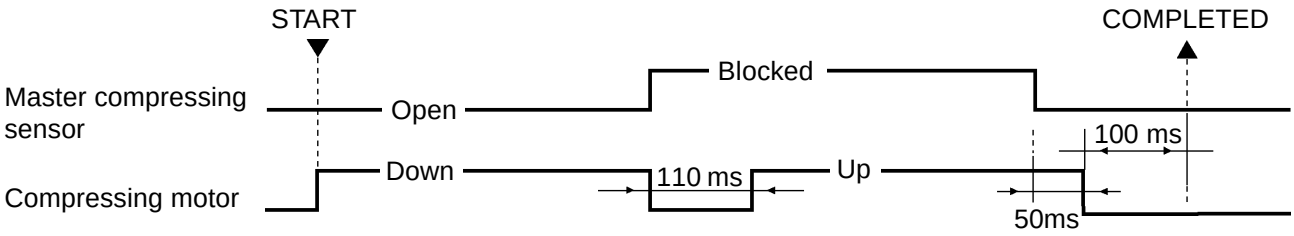


3. When halfway down

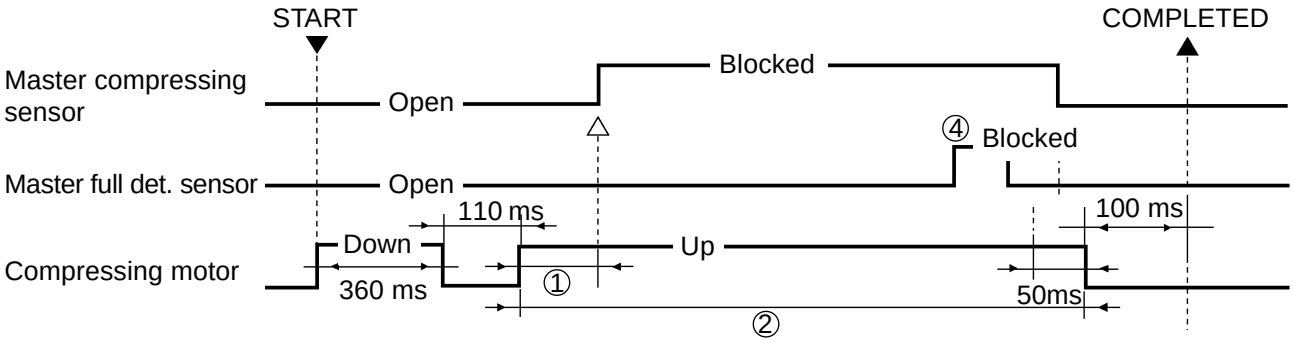


Master Removal Unit Home Positioning Timing Chart

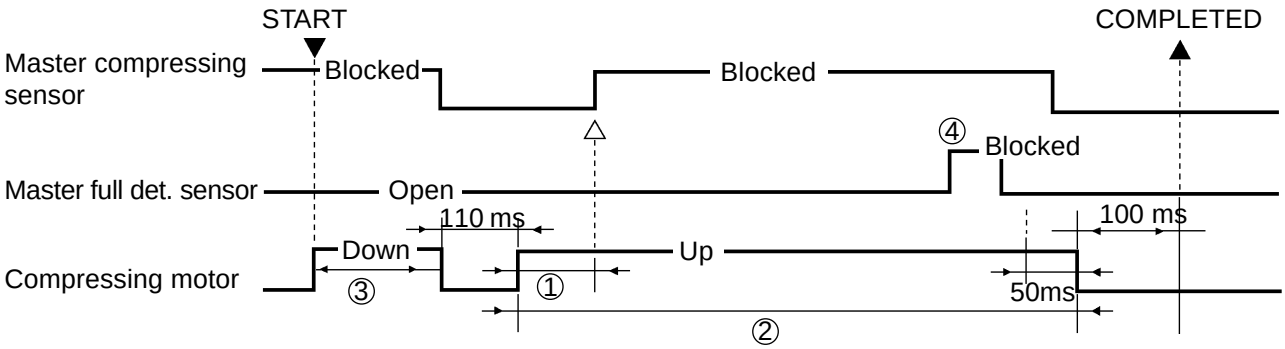
1. When Master compress plate is already at Home Position.



2. When Master compress plate is all the way down.



3. When Master compress plate is halfway down.



① If the light path of Master compressing sensor is not blocked within **1 second** after the Compressing motor rotates in the **"Up"** direction, the machine assumes Compressing motor is locked and displays error message **[E 07]**.

② If the light path of Master compressing sensor is not opened within **10 seconds** after the Compressing motor rotates in the **"Up"** direction, the machine assumes Compressing motor is locked and displays error message **[E 07]**.

③ If the light path of Master compressing sensor is not opened within **10 seconds** after the Compressing Motor rotates in the **"Down"** direction, the machine assumes Compressing motor is locked and displays error message **[E 07]**.

④ If the light path of Master full detection sensor is not blocked at all from the time the Compressing motor rotates in the **"Up"** direction and stops, the machine assumes the Master disposal box is full, and displays the message **[C 43]**.

2. Master on the Drum (before master removal) Check Mechanism

1. Master Sensor

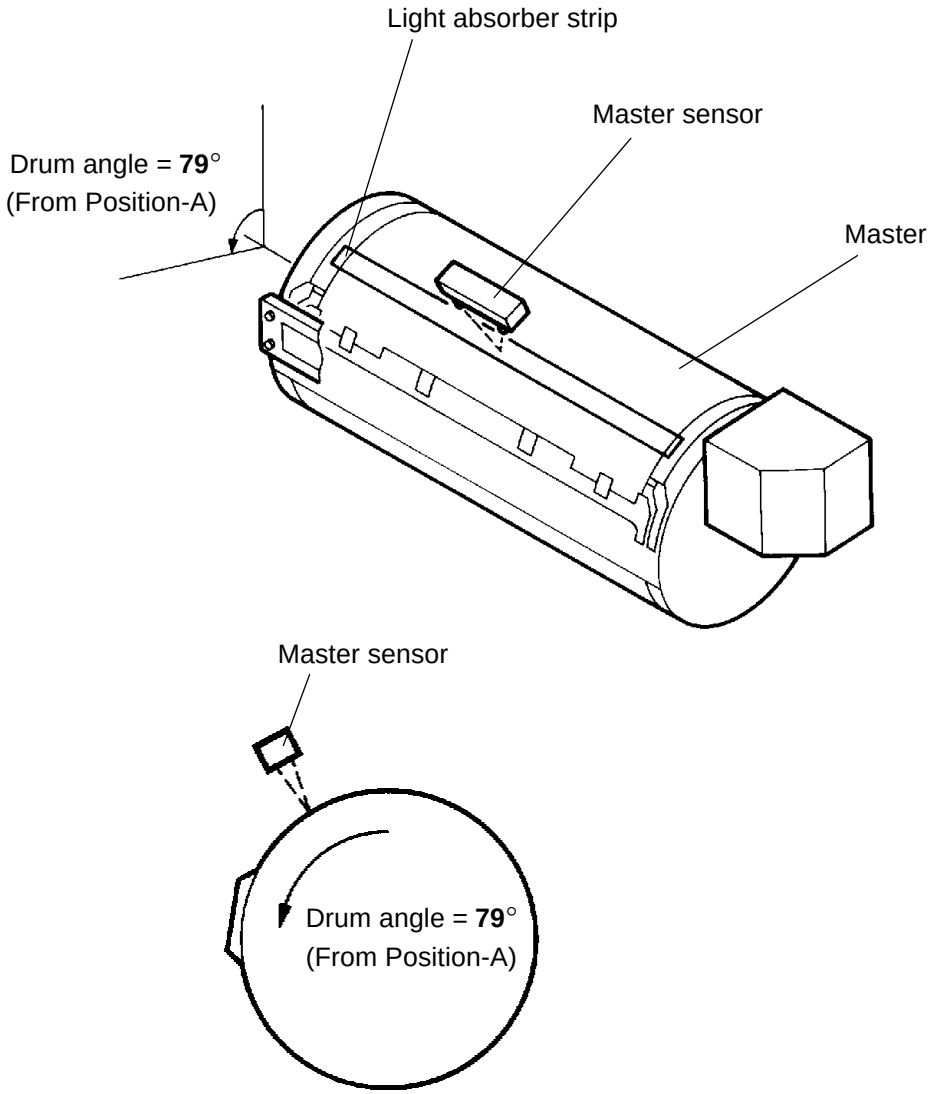
- Master sensor checks the presence of the master on the Drum when the Start button is pressed for confidential master making or normal master making.
- The sensor looks for the master on the Drum when the Drum rotates 79° from the Position-A.
- If the machine already knows the presence of the master on the Drum from the earlier machine operations, this master check movement is skipped.

2. When master is detected on the Drum

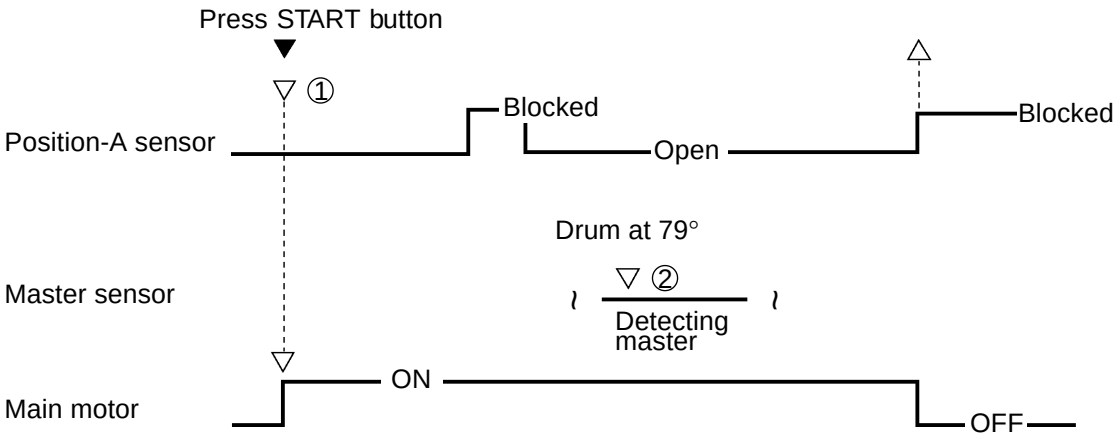
- The machine goes into master removal and Master removal sensor becomes active.

3. When master is not detected on the Drum

- The machine skips the master removal movement and goes directly into master making.



Master on the Drum Check Timing Chart (before master removal)



① The Drum is at Position-B when the START button is pressed.

② If the light of the Master sensor is reflected back (detecting master) at Drum 79°, the Master removal sensor becomes active and checks the master during the master removal.
If the light of the Master sensor is not reflected back (master not detected) at Drum 79°, master removal movement will be skipped.

* If the machine knows the presence of master on the Drum from earlier machine movements, this master on the Drum check movement is skipped.

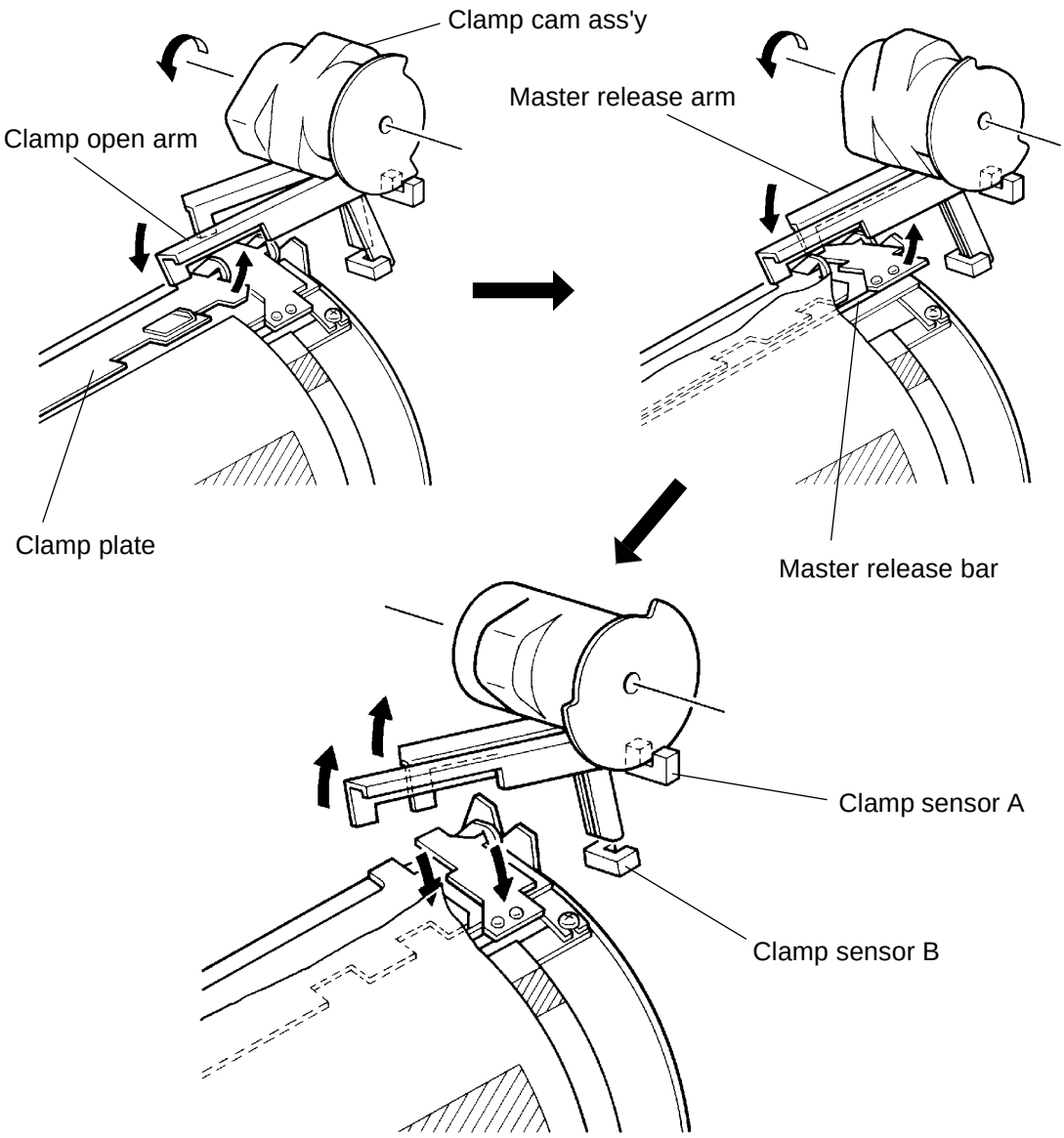
3. Clamp Plate Master Release Mechanism

1. Master on the Drum check

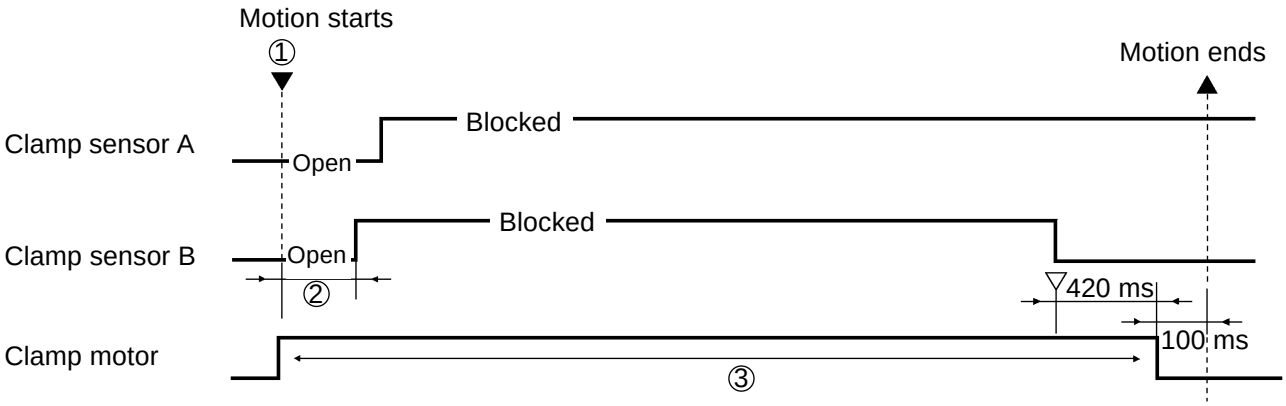
- When the START button is pressed for confidential or regular master making, the Drum rotates and presence of the master on the Drum is checked.
- If a master is found on the Drum, the master release movement is made after the Drum returns to Position-A.

2. Clamp open arm & Master release arm

- The Clamp open arm comes down first and opens the Clamp plate to free the leading edge of the master.
- Next, the Master release arm comes down and raises the Master release bar to push the leading edge of the master out of the Clamp plate.
- The Clamp motor continues to rotate the Clamp cam ass'y until both the Clamp open arm and Master release arm are lifted to closes the Clamp plate and the Master release plate.
- The master release movement is completed when the light path of the Clamp sensor B becomes open and the Clamp motor stops.



Clamp Plate Master Release Timing Chart



① When START button is pressed for master making, if the light paths of Clamp sensors A and B are not both open, the Clamp motor turns to bring the Clamp unit to the home position before making the movement to release the clamped master.

② If the light path of Clamp sensor B is not blocked within **3 seconds** after the Clamp motor activates, the machine assumes that the Clamp motor has locked and displays error message **[E 03]**.

③ If the light path of Clamp sensor A does not become blocked and that of Clamp sensor B does not become open within **12 seconds** after the Clamp motor activates, the machine assumes that the Clamp motor has locked and displays error message **[E 03]**.

4. Master Removal Mechanism

1. Master Removal Vertical Transport Motor

- After the leading edge of the master is released from the Clamp plate, the Vertical transport motor activates to rotates the Vertical transport roller (up), Vertical transport roller (Down), Pulley shaft and G-Belts.

2. Main Motor

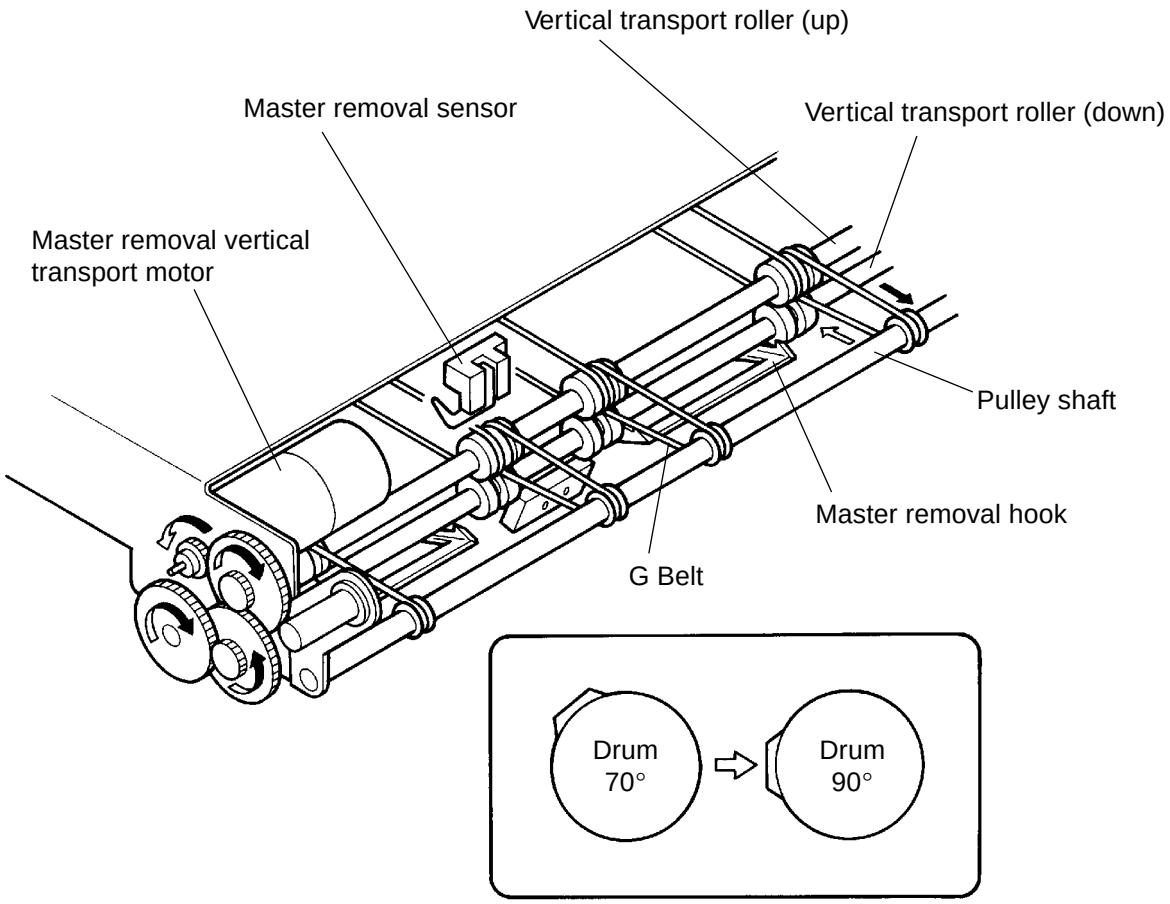
- The Main motor rotates the Drum the same time the Vertical transport motor activates.
- By the rotation of the Drum, the leading edge of the master comes in contact with the G-Belts and the separation of the master from the Drum starts.
- The Main motor and Master removal motor stops to complete the master removal movement when the Drum comes back to the Position-A after making one rotation to remove the master.

3. Master Removal Hooks and G-Belts

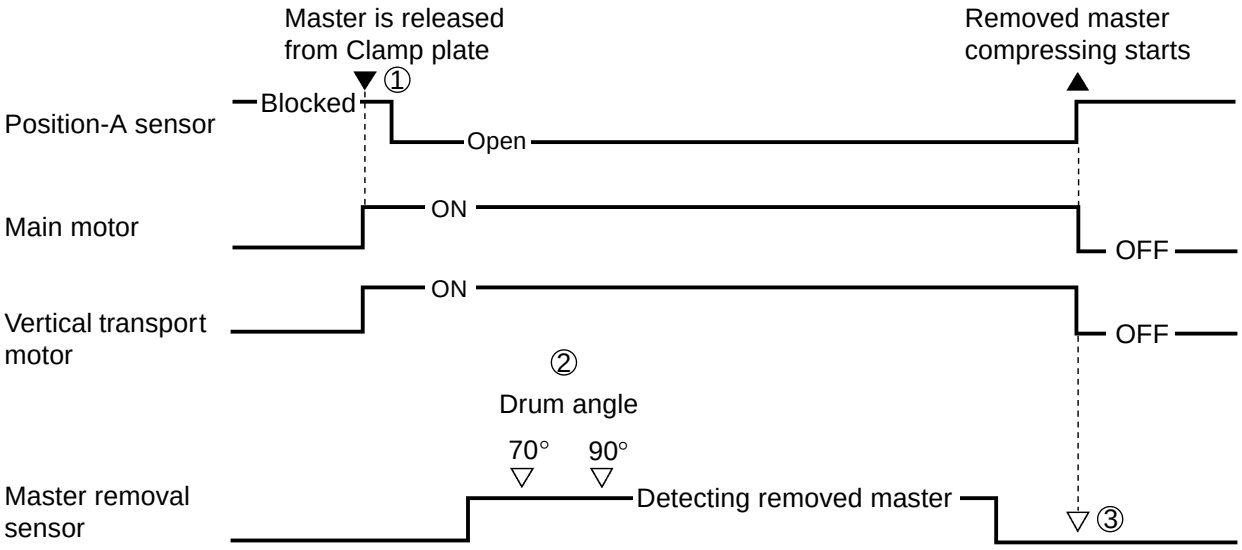
- The master removed from the Drum is guided in between the Vertical transport rollers (Up) and (Down) by the Master removal hooks and G-Belts.

4. Master Removal Sensor

- Master removal sensor checks the presence of the removed master in front of the Master disposal box to check for master removal jams.
- The Master removal sensor looks for presence of removed master twice,
  The first time is at 70° Drum rotation from Position-A and the second time is at 90° Drum rotation from Position-A.



Master Removal Timing Chart



① If the master was not found on the Drum before going into the master removal movement, the master removal movement is skipped after the Clamp plate does the "Clamp plate master release" movement.

② During the master removal, if removed master is not detected by Master removal sensor at Drum angle **70**°, the Master removal sensor looks for the removed master for the second time at Drum **90**°.
If removed master is still not detected by the Master removal sensor at Drum **90**°, the machine assumes master removal error has occurred and displays the message **[C 25]**, and stops the Main motor at next Drum Position-B.

③ When the Drum returns to Position-A and Master removal sensor confirms the removed master has cleared through the sensor, the machine starts compressing the removed master.
If the Master removal sensor still detects removed master, the machine assumes removed master has jammed at master removal area and displays message **[C 26]**.

* If Master removal sensor detects removed master while the machine in idle, the removed master jam message **[C 26]** is displayed.

* If over load current is detected for **0.3 seconds** after the Master removal vertical transport motor is activated, the machine assumes the motor has locked and displays error message **[E 14]**.

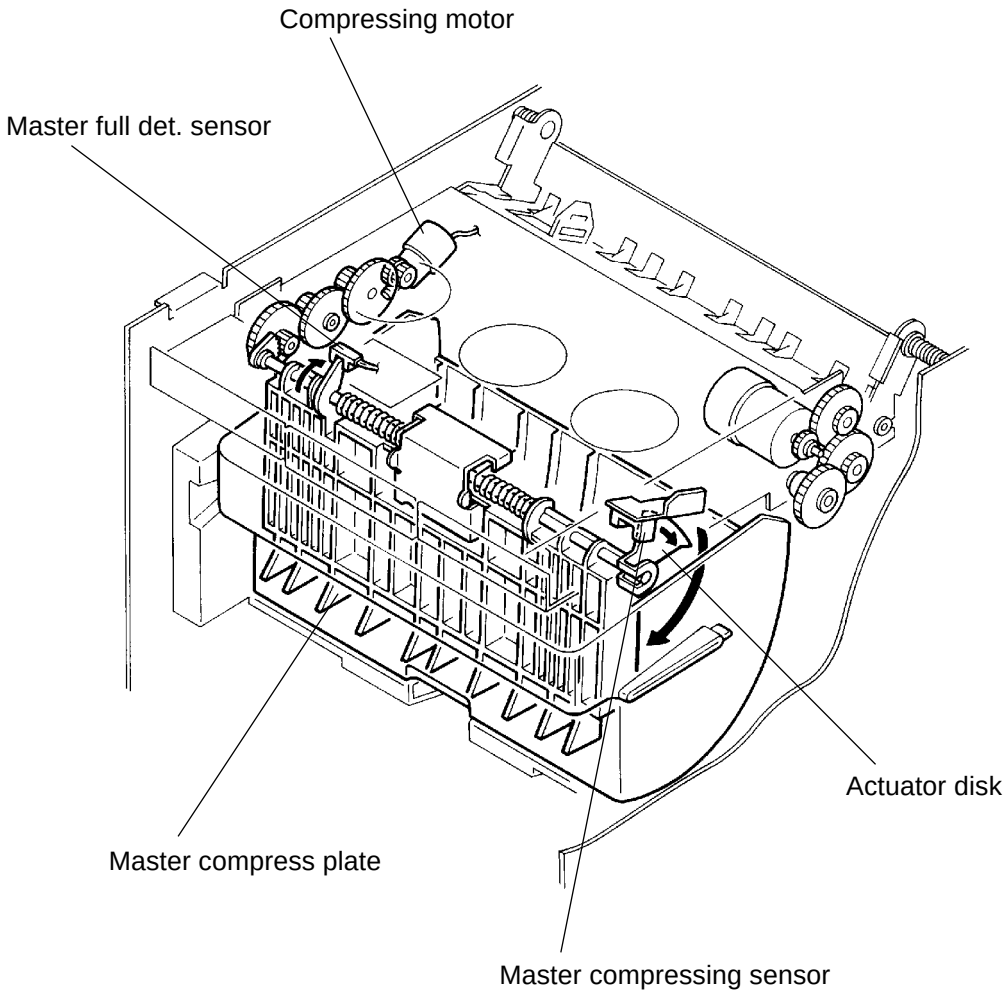
5. Disposed Master Compressing Mechanism

1. Compressing Motor

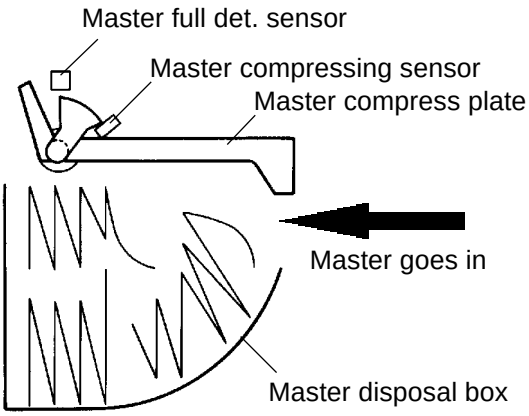
- As the master is removed from the Drum and transferred into the Master disposal box, the Compressing motor activates and rotates the Master compress plate down to compress the disposed master in the Master disposal box.
- The Compressing motor stops when the Actuator disk on the Master compress plate escapes from the light path of the Master compressing sensor.
- The Compressing motor then rotates in the opposite direction and lifts the Master compress plate back to the home position.

2. Master Full Detection Sensor

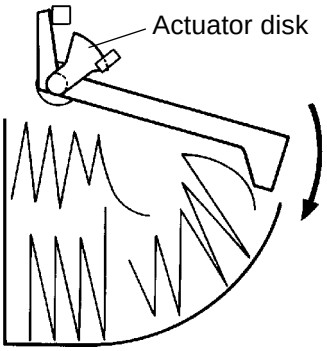
- If the Master full detection sensor does not detect Master compress plate at all during the disposed master compressing movement, the machine assumes that the Master disposal box is full.



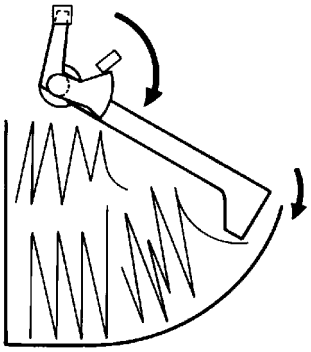
Disposed Master Compressing



① The Master compress plate is at Home position.
Removed master from the Drum is transferred into the Master disposal box.

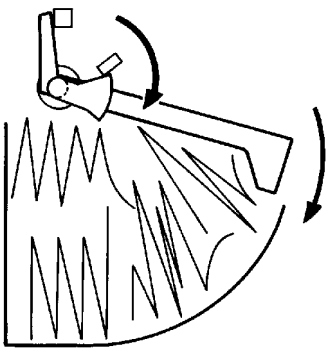


② After the removed master transfers into the Master disposal box, the Master compress plate starts down to compress the removed master inside the Master disposal box.
With the downward movement of the Master compress plate, the Actuator disk blocks the light path of the Master compressing sensor.



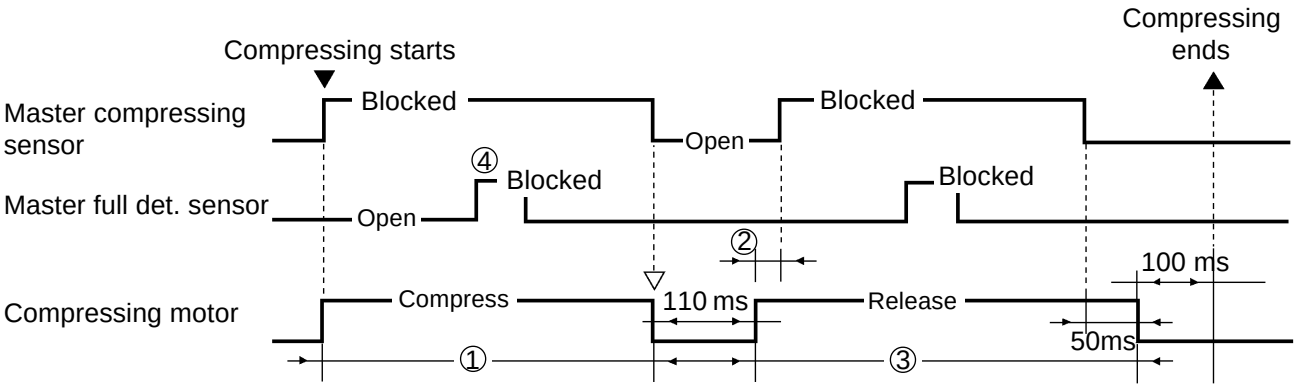
③ As the Master compress plate comes all the way down and the Actuator disk clears from the light path of the Master compressing sensor, the Compressing motor stops for a certain set time and then rotates in the other way to raise the Master compress plate back to the Home position.

Master Full Detection



* When the Master disposal box becomes full with disposed masters, the disposed masters prevent the Master compress plate from compressing down any further and the actuator on the extension of the Master compress plate can no longer block the light path of the Master full det. sensor.
The light path of the Master compressing sensor is blocked before that of Master full det. sensor is blocked.
This is the moment the machine determines the Master disposal box to be full.

Disposed Master Compressing Timing Chart



① If the light path of the Master compressing sensor does not become open within **10 seconds** after the Compressing motor rotates to compress, the machine assumes Compressing motor has locked and displays error message **[E 07]**.

② If the light path of the Master compressing sensor is not blocked within **1 second** after the Compressing motor rotates to relieve the pressure, the machine assumes Compressing motor has locked and displays error message **[E 07]**.

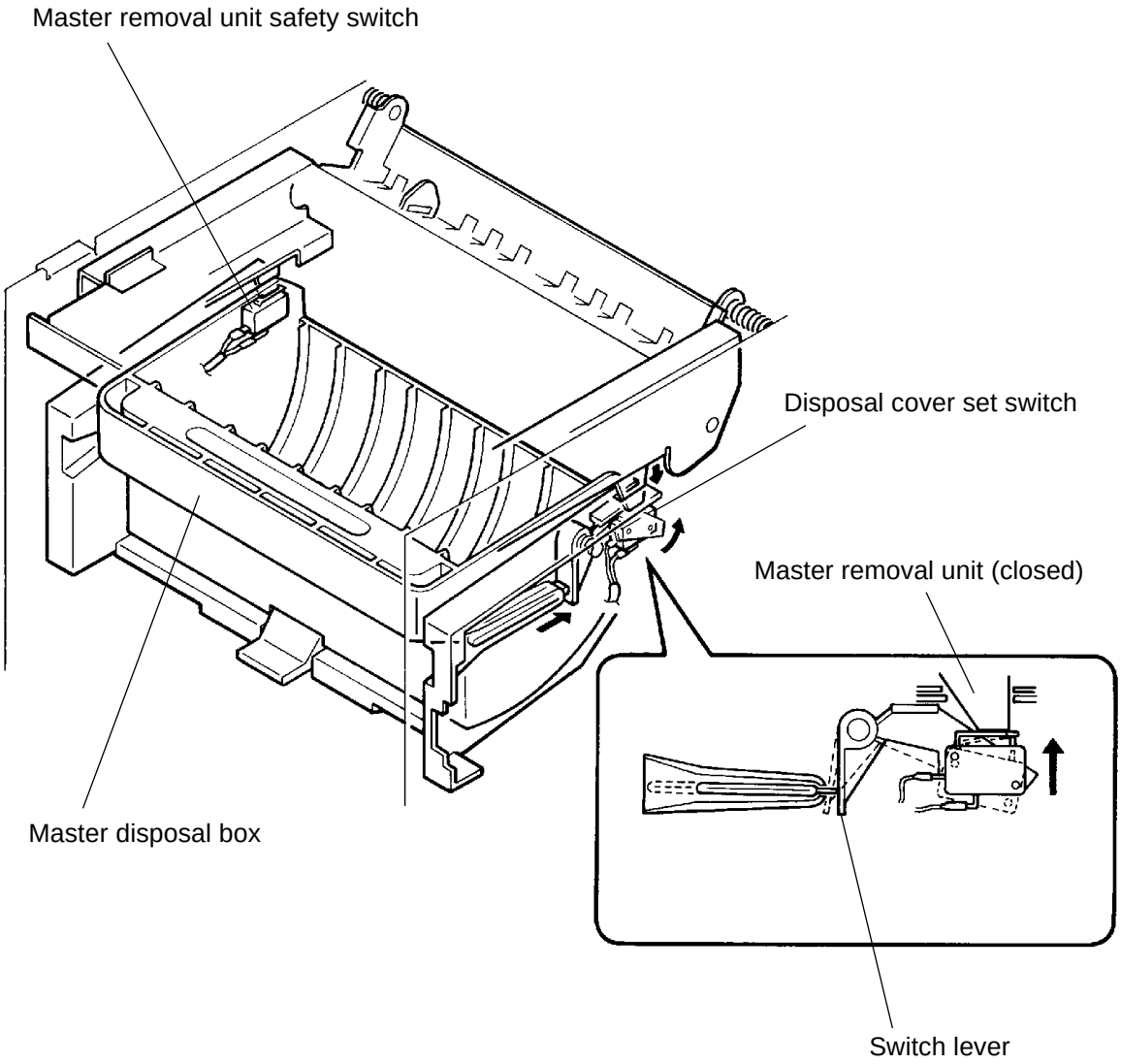
③ If the light path of the Master compressing sensor does not become open within **10 seconds** after the Compressing motor rotates relieve the pressure, the machine assumes Compressing motor has locked and displays error message **[E 07]**.

④ If the light path of the Master full det. sensor is not blocked at all before the light path of the Master compressing sensor becomes open after the Compressing motor rotates to compress, the machine assumes the Master disposal box to be full and displays the message **[C 43]**.

6. Master Disposal Box Set Mechanism

1. Disposal Cover Set Switch

- Disposal cover set switch checks the presence of the Master disposal box and whether the Master disposal upper cover is opened or closed.
- When the Master disposal box is set in the machine, it pushes the Switch lever and lifts the Disposal cover set switch.
- The lifted Disposal cover set switch can then be pressed when the Master removal unit is closed.

2. Master Removal Unit Safety Switch

- As with the Disposal cover set switch, the Master removal unit safety switch is lifted when the Master disposal box is set in the machine.
- The lifted Master removal unit safety switch can then be pressed when the Master removal unit is closed.